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Gas Journal

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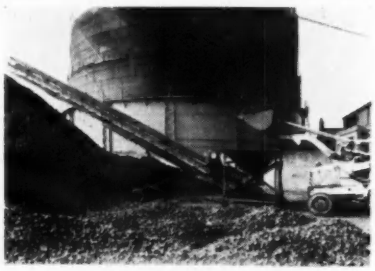

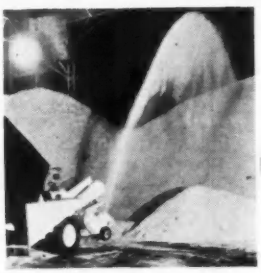

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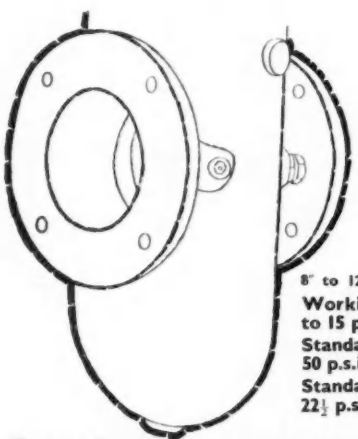

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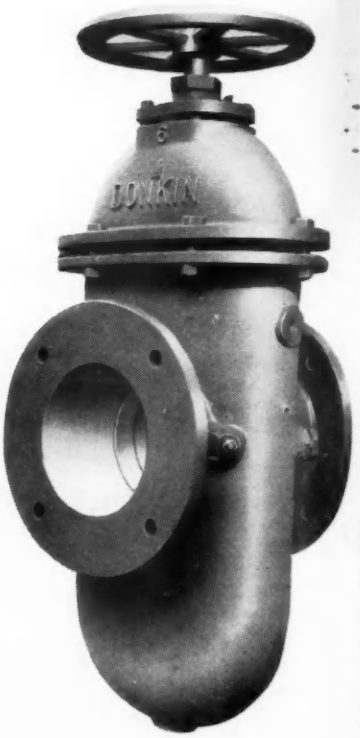

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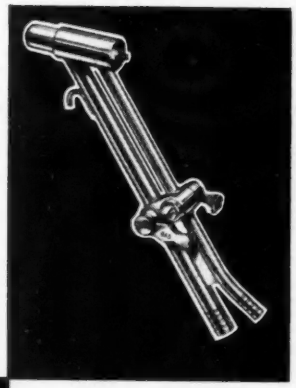

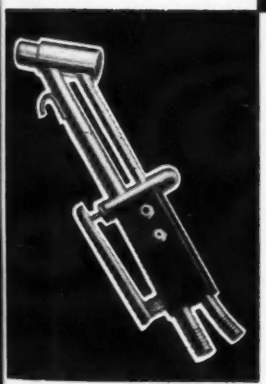

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Publishers' Notice See Page 570, December 28, 1960

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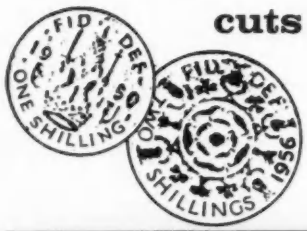

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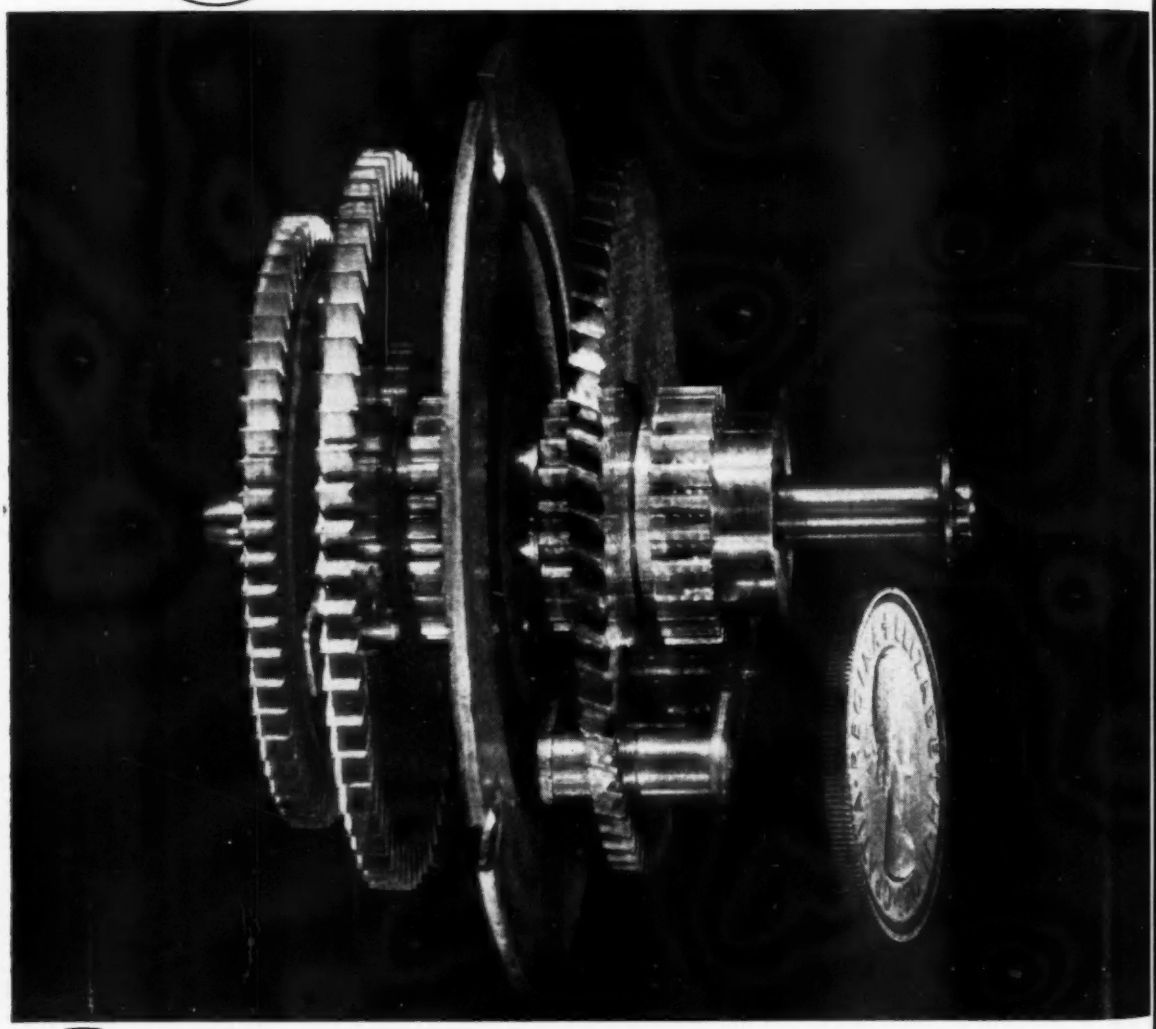

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Management—mystique or machine?

OUR attention has once more been drawn to the subject of management and its place in the organisation of an area board by a paper presented by Mr. Sydney Smith, Chairman of the Scottish Gas Board, to a joint meeting of the Scottish Western and the East of Scotland Junior Gas Associations. In the abstract which we are publishing he sets out as concisely as possible the changes which have taken place in his own Board's organisation and also the qualities he would wish to find in his future managers.

Our first reaction to any discussion on this particular subject, in which we sometimes find ourselves groping with some difficulty, is: How can the selectors of those destined for higher management decide with certainty that the raw material available is quite suitable? And if this decision can be made according to accepted rules of selection, where is that raw material coming from? Can suitable managers of the type usually understood by that word today be found from the ranks of those already in the gas industry, or must they be imported from outside? Again, what type of background should the candidates for such posts have? Should they be engineers or should they be accountants? Clearly these are vital questions which affect anyone already in our industry who hopes to aspire to the most important posts carrying the highest salaries. Is good management a matter of mystique, machine-like efficiency, or the harnessing of common humanity? Probably it is an amalgam of all three, although it would seem that personality plays a vital part.

As Mr. Sydney Smith points out, the possession of a suitable personality is a most valuable asset for the management recruit, and without it he can do little to acquire it; but at the same time management techniques can be studied and practised like any other science, however empirical it may be. Therefore anyone equipped with a less forthright personality, but possessing obvious integrity and the will to understand situations as they occur and exercise his judgement, can compete for these much sought-after posts.

The next question we would ask ourselves is whether the aspiring manager needs any kind of specialised background training—in fact whether he has to know anything about the industry he is going in to.

We would be inclined to answer that question quite simply 'No,' since it is our firm impression that among the most successful managers, in the gas industry at any rate, many of them are not engineers but have either entered the industry as specialists in some other capacity or have been recruited from outside for some specific management job.

It is naturally a bitter pill for the gas engineer to swallow, that unless he is quite exceptional in some way outside his profession he cannot hope to compete for the top jobs. To put it even more bluntly, his professional engineering qualification may even be a disadvantage to him.

This, we think, is rather exaggerating the issue because the very act of qualifying as an engineer has provided him with a means of training his intellect and exercising his powers of thought and judgement. Anyone sufficiently flexible in his mental outlook and capable of a quick and accurate summing up of a situation should be able to apply the new techniques of management once they have been acquired.

Mr. Sydney Smith makes an excellent point when he emphasises the tendency today to drop the epithet 'general' when referring to the managerial head of a department or the representative of an area or district. No longer does such an appointment entail a 'general' direction of a number of activities in detail, but the direction of a group of specialist officers in charge and in complete control of some aspect of the activities of the enterprise.

It is here that we appear to be entering the realms of functionalism, and it is here too that the scientist or technologist with extensive specialist training comes into his own. The expert with the gift of administration can, we think, find his niche as head of some subordinate department demanding the most minute understanding of the techniques of those working in it.

It will then be the manager's job to co-ordinate the

workings of these departments for which he is ultimately responsible to a higher authority. Mr. Sydney Smith makes this quite clear when he describes the position of the chairman of a board in relation to his senior staff. He, the chairman, need have no detailed technical knowledge of the work of those in charge of technical or technological departments, in fact he might be better able to 'manage' if he confines himself to giving instructions, in the certain knowledge that the recipients will know exactly how the instructions are to be interpreted, each for his individual circumstances and without further interference in detail.

It is management's responsibility to initiate or pass on instructions and to see that they are carried out without influencing its executive officers by a fussy attention to detail.

Here then is the answer to the doubts that must arise in the minds of many trained in our industry who see their freedom of action likely to be restricted by the dead hand of the bureaucratic central administration. By some such means it should be possible to keep every 'functional' department vigorous and lively, free to work within the limits of an overall policy, wisely and efficiently administered by the departmental head.

We must admit then that top management may well be a profession in its own right, and must therefore be able to take its place in the general administration of the organisation without obviously interposing its will in day-to-day working, which would result in confusion, frustration and a fall-off in efficiency.

The boards of a nationalised industry are clearly a severe test for any system of central management. As Mr. Sydney Smith points out, to be economic, certain functions must be centralised—medical and public relations are examples—while at the other end of the scale the small undertaking is too small for functionalism of any kind.

The centralisation of accounting in Scotland into three main centres at present, and possibly into one with the employment of a computer to do the calculations, is merely a means of giving full employment to an expensive machine. A good managerial set-up having adopted such an expedient,—often with an increase in the stream of paper—should not permit it to interfere with existing good management at all levels.

The top manager may be a member of a fledgling profession, but he is an important co-ordinator for those of more humdrum and workaday professions, who are ultimately responsible for the successful carrying out of the Board's policy.

A helicopter for mainlaying

THE use recently of a helicopter by the Le Bas Tube Co. Ltd. to assist in the laying of 8-in. flanged pipes in difficult terrain, prompts us to ask ourselves whether such a means of transportation might be used effectively by the gas industry.

The operation, which we in fact witnessed, was the laying of a pipeline, 2,000 ft. long, for carrying clay slurry from excavators working in the North Kent marshes near Gravesend to a pumping station for loading into barges by which it is carried to a nearby cement factory. The overall distance is some nine miles. The terrain, especially at this time of the year, is particularly difficult for the transport of heavy objects —each length of pipe weighs 440 lb.—and in this case the pipes would have had to be loaded into barges, floated down a 'fleet' to a nearby patch of swampy land, unloaded and manhandled to the site.

The helicopter transferred the load pipe by pipe from a pipe stock on a metalled road to the site, placed each in its exact position and returned to the pipe stock. The total time taken over each journey was under four minutes, during which the pipe joint was completed. The laying of the pipeline took one working day instead of, perhaps, two weeks.

Could the gas industry use any such technique in laying cross country gas mains? The key to the success of the Gravesend operation lies in the type of pipe used and the ease and speed with which the joint can be made. This would not be so with a welded joint in a modern high pressure gas main, although a low pressure main utilising a flanged joint or modern patent coupling might be able to take advantage of the 'sky-hook' technique. Would the main need to be buried? If so a trench would have to be dug beforehand, the pipe section placed in it by the helicopter, and the joint made in the ordinary way.

The advantage of this form of transport in the actual operation was undoubtedly the way in which it overcame the difficulties encountered on the spot, the delay and the extremely arduous work involved in manhandling awkward objects on soft ground. In like circumstances could any advantage be gained by double handling the sections of pipe for the laying of a welded gas main in similar country? First the pipes would be transported to the site and stocked there; later the helicopter could place each in position as needed for welding. A possibility perhaps, but time consuming as far as the operation of the helicopter is concerned. A longer and less direct route in better terrain might be cheaper.

Now that this technique has been successfully tried, however, might not the gas industry consider laying its mains in country hitherto thought impossible, since it is well to remember that it has pioneered techniques in the crossing of rivers and other obstacles of similar nature with considerable success?

Abstract from a paper read at a joint meeting of the Scottish Western and the East of Scotland Junior Gas Associations.

Organisation, Management and the Scottish Gas Board

By SYDNEY SMITH, C.B.E., M.INST.GAS E., F.INST.F.,
CHAIRMAN,
SCOTTISH GAS BOARD.

THE importance of a good management organisation cannot be over-emphasised. It is the foundation upon which a successful business is built; it must be constructed to meet the needs of particular circumstances and must be capable of modification whenever changing conditions make this necessary.

There are three types of organisation most commonly referred to, which are: (a) The 'line' type—sometimes referred to as 'line and military'—in which responsibility is direct from the subordinate to the superior, and conversely; the superior has responsibility of a general nature, and there are no specialist officers carrying subsidiary responsibility of a specialist nature cutting across the straight up-and-down pattern;

(b) the 'line and staff' type, which combines the necessary flow of authority from top to bottom, as in the case of the 'line' type, with side channels of authority flowing out from the main up-and-down stream at different points in the form of functional or staff departments; and

(c) the 'functional' type in which specialist officers are responsible for the performance of one particular function, thus permitting a concentration of effort in one specialised channel.

Over the period of the past ten years or so, there has been a gradual, but definite, movement towards centralisation and standardisation; a movement which was inevitable if the full benefits were to be reaped of large-scale operations.

During this period, and particularly during the past four years, the structure of our organisation has undergone drastic changes to accommodate the process of centralisation, and it may be helpful to review the major changes which have taken place.

Decentralisation

On May 1, 1949, when the Board became responsible for 194 undertakings, it was in the interests of the Board's customers and of the industry generally in Scotland that the initial scheme of organisation should have a substantial measure of decentralisation. After about a year, divisional controllers and group managers were made responsible for the efficient conduct of the undertakings within their territory. In addition, and where appropriate, a number of sub-group managers were appointed to assist in the supervision of groups of small undertakings.

This form of organisation, based on the 'line and staff' principle, continued to operate, subject to very slight modifications, including a movement towards a form of functional organisation within the Lanarkshire Division, until early in 1957.

At that time a new structure of organisation was introduced, which was designed to operate in larger units, and was based mainly upon the functional form of organisation by divisions. In place of the former ten divisions and groups, four divisions were created.

Organisational structure

Because of the geographical nature of the area, the form of organisational structure varied to some extent within the four divisions. It was hoped to enable each specialist officer to extend his influence as widely as possible in the field for which he was most suited; and, at the same time, to enable managers to concentrate their attention upon a reduced number of activities, instead of having to try to keep abreast of the multitude of complex developments which had been taking place in all functions. The local manager continued to operate as a vital link between the Board and their customers; but with the growing complexity of the Board's business it was not humanly possible for him to be an expert in every field of the Board's activities.

Early in 1960 the number of divisions was reduced to three by the amalgamation of the Central and Northern divisions; and on October 1, 1960, there was brought into operation a new, more functionalised form of organisation.

A functional form of organisation cannot be operated at small undertakings, and in those cases the local managers continue to be responsible for all functions and to be supervised by management-liaison officers who are responsible, through the divisional managers, to the area manager for the conduct of these undertakings.

Since vesting date, therefore, a transformation has gradually been taking place in the organisational structure of the Board: What was basically a 'line and staff' system of control in the earlier days, is now, mainly, a functionalised form of control; and it may be appropriate at this stage to outline some of the reasons for these major changes.

Certain services, such as legal and medical, have operated centrally since their inception, because only in this way could they be economically justified.

Subsequently, other specialised services, such as press and public relations, advertising and publicity and central purchasing were established at Board headquarters; and, as examples of standardisation, we might mention gas

tariffs, which are common throughout the area; and the introduction of the coke marketing scheme, where prices are standardised in zones.

A steady process of integration of production has already made possible the closure of 95 uneconomic works, following the provision of bulk supplies of gas from more efficient units: A process accelerated by the decision to construct the Lurgi high-pressure, complete-gasification plant at Westfield, which will come into production in the near future together with the associated high-pressure supergrid.

Similarly, in accounting, the Board's decision to introduce mechanised accounting at the three main centres at Glasgow, Edinburgh and Perth, together with the possibility of installing an electronic computer to serve the whole area, has made central planning and direction essential if full and economic use is to be made of this equipment.

Close liaison

There is one important factor which must always be kept constantly in mind. There must be close liaison between functions at all levels, otherwise there is a danger that the organisation could develop into a series of water-tight compartments. One of the difficulties of all large-scale organisations is the problem of communications: The need to ensure that policy decisions and instructions are made known to, and clearly understood by, all levels of management. It is also essential that constant checks are made to ensure that instructions are being observed.

As well as issuing orders it is the responsibility of management to make certain that instructions are being carried out; and to carry out their own responsibilities with eyes that see, as distinct from eyes that only look; there is all the difference in the world between the two.

It must never be forgotten that organisation is no more than a tool of management; and it is by this yard-stick that its effectiveness must be judged. The purpose of any management organisation is to seek to achieve success, and to do this it must be designed to make the best possible use of capital, labour and materials.

Organisation is the ordered structure which is created to accomplish this objective; and the measure of our success is the extent to which we can provide a first-class service to our customers at the lowest possible price, a price at which they are prepared to buy.

The most economical use of capital, labour and materials must be kept constantly in mind at all times, and particularly in the making of decisions.

Personality and character are, of course, mostly inherent, and the man who lacks the right qualities in this direction can do very little about it. But with the complexities of industry today, management skills and techniques are matters which can be studied, and studied fruitfully.

There is no shadow of doubt that we have made quite remarkable progress in reducing costs through increased efficiency of production; and when our new form of organisation comes fully into operation, we shall obtain further substantial economies, not only in production but in all other directions.

For the first time in years, our sales of gas for this year since April 1 are slightly higher than for the corresponding period last year; temperature differences are not altogether responsible. Production results in 1959-60 were most encouraging and so were our sales of appliances, which broke all previous records and were not very far short of £4 mill. in value.

At the end of the financial year to March 31, 1960, we had an accumulated deficit of £1.5 mill. on revenue account. We must wipe out this deficit and balance our accounts at the earliest possible date. But if we are to remain competitive with other fuels, it would be most unwise at this stage further to increase the price of gas in order to obtain the necessary additional revenue.

There are two things, therefore, that must be done: We must increase our efforts to reverse the fall in domestic consumption, and we must reduce all expenditure to the absolute minimum, consistent with efficient operation.

Cheaper sources of production will soon become available, and it is possible that even further advances will be made in this direction.

Our sales force has been strengthened in both the domestic and the industrial sections, and steps are being taken to make these forces even stronger; the training of salesmen and gasfitters has been greatly improved, and so has training in many other directions; our advertising, publicity, press and public relations' departments are also receiving attention.

In the industrial field, demand continues to expand, and the growing industrial activity throughout the central belt of Scotland provides opportunities which must be followed up with every means in our power.

Substantial economies have already been made through the intelligent re-deployment of labour, the elimination of unnecessary waste and the close scrutiny of proposed expenditure of every kind; and these are the directions of approach which must be kept clearly and constantly in mind.

In these days, conditions are subject to almost continuous change; and it is the job of management, by anticipation and planning, to take advantage of all circumstances which operate in our favour and to nullify, or at least to mitigate, the factors which are unfavourable.

Work-study and clerical-methods teams are now at work in all divisions of the area, and intelligent use of these services will play a major part in reducing costs and raising our standards of efficiency.

But the introduction of work study does not reduce, in any way, the responsibility of management for cost control. It is still the manager's function to seek and to secure increased productivity and improved efficiency in the function, or functions, for which he is responsible.

It is sometimes argued that, as the cost of capital, materials and labour add up to about 73% of our total expenditure, there is very little scope for cutting costs.

This argument, however, is demonstratively fallacious because it presupposes that little improvement can be made in the amount of capital, materials and labour required to produce a given result.

It *is* possible to cut costs and perhaps our best guide to cost consciousness is to spend the Board's money as you would spend your own; provided, I must add, that you spend your own money wisely!

DISCUSSION

Opening the discussion, **Mr. J. E. Scott,** vice-president of the East of Scotland Junior Gas Association, referred to the problem of communication between functions, which he thought was becoming more and more difficult as the scale of the organisation and specialisation increased.

At the Lurgi plant at Westfield, specialisation would appear to be almost complete, and he personally missed the discussions which he used to have in other places with officers from other departments, and which were so valuable to all concerned.

Many of the operators at Westfield were newcomers and he felt that some steps should be taken to increase their appreciation of what the gas industry of to-day stood for.

On the wider aspect of specialisation, he sometimes wondered whether they were not missing a great deal, particularly in the case of the young men coming into the industry. Would the lack of general experience in future executives mean that the gas industry would suffer?

The Scottish Gas Board had seen many striking developments since its early days and it was not to be expected that the organisation was complete or final.

He asked if the Chairman would be prepared to give them a peep into the future and suggest what the trends might be in the years to come.

Mr. Sydney Smith said in reply that Westfield was in a special position. The first staffing took place even before they started to clear the site so that the key people would have an opportunity of seeing the works built from the ground up.

Obviously they had all been very preoccupied with their different problems and there had been little or no opportunity for an interchange of discussion between the various functions.

Interchanges

'But it is our idea,' he said, 'as time goes on and the works come into operation, that we shall not only get opportunities for interchange of ideas but also to interchange the personnel between the three departments dealing with gasification, oxygen production and purification.

'Through that, the staff will gain knowledge and experience of the operations of the other departments and this should be very valuable.'

On the wider aspect of specialisation, he said that in Scotland general managers were no longer responsible for all functions; the word 'general' had gone out of the window.

He added: 'As for a chairman, it does not need a chairman to have knowledge of all the branches of the industry of which he is chairman. He has specialist officers and there is really no need for the man at the top to have the detailed knowledge of the specialist—in fact, it is impossible.

'If a chairman has intelligence, a broad experience of industry and life, the qualities of leadership, and the ability to engender among his staff respect for his ability and loyalty, an atmosphere develops where these people will come to the chairman and will talk about their problems and ask for guidance when it is needed.

'It is all part of the team work. I would say that because of the complexities—and they are becoming greater—it would not be necessary for a man to have the broad basis of training which in the past has been considered essential in the gas industry.'

What was needed was an understanding of the other fellow's job and a knowledge of some of the problems he had to face.

As for 'a peep into the future,' a great many people in the room were just as capable as he was of looking into the crystal ball. It must be obvious to everybody that the present form of organisation was one to which the Board had been working for the past ten years.

Mr. J. Fraser, Paisley, asked how the Board obtained the reactions of customers to new developments.

Mr. Smith: 'We hear from correspondence, from consumers; we hear from M.Ps.; we hear from the Consultative Council. But the volume of what we hear is not nearly enough.

'I would much sooner have 1,000 complaints in a month than ten—if I get a thousand I know that something is wrong and that something has to be done; with ten, you do not quite know.

'We also get reports from district managers and other officers, but again we do not get enough. It is just as important in an organisation to get communications going up the way as down the way.

'We do not hear half enough of what people are thinking—not only the general public, but within our own organisation.

'A great deal could be done at district level by meter readers, supervisors, district managers and others. If there was a feeding up of information to the Board, it would be one of the things best calculated to give us the greatest advantage we ever had—some idea of the public mind.'

Mr. J. C. McCulloch, Edinburgh, commented that they never seemed to see any official reply on behalf of the Board in the statements that sometimes appeared in the Press, particularly in connection with gassing incidents. Was this part of the policy of the Board, he asked.

Mr. Smith replied that they had privately taken certain steps in this matter, but public replies were of very dubious value.

'Before you know where you are you are involved in something entirely different from the original point. You do not know where you are going to finish, and you could put yourself in a far worse position than if you ignored it.'

Mr. A. M. Jackson, Dumbarton, pointed out that Mr. Smith had emphasised the need for all of them to learn as much of good management as they could.

In their own specialised jobs that was not always easy. As a result, it would be interesting to know from where the top administrators of the future would be chosen. One problem was how to retain the stimulus and excitement of the earlier days.

Mr. Smith pointed out that for some time they had been in a position of reorganisation and a condition of change and disturbance to a considerable extent. They had not yet settled down.

When they had done so it might be possible to do something additional in the way of providing opportunities, such as seconding to another section.

Replying to an observation by **Mr. Jackson,** who quoted Professor Parkinson to the effect that control could be carried to the point where it became wasteful, **Mr. Sydney Smith** said: 'To an extent, that is true. Control of any kind in an organisation like ours gives rise to one thing that sticks out more than all others, and that is the amount of paper work that flows in all directions.

'You ask for records of certain things, and in the hurly-burly of work it is very easy to forget the existence of such things and statistics continue to be fed in which are no longer needed.

Tremendous waste

'Tremendous waste can take place in this way. We try to avoid that by having a survey at intervals and subjecting these things to the test of necessity. The object is not only to cut down material waste but to save time.'

How were they going to get good managers in the future? There were necessary qualities to be looked for; some people had them, and some people had not. But the principles could be assimilated if the people were prepared to take the trouble to assimilate them—it was surprising how many people were loth to accept responsibility.

'The way to get good managers in the future is to make good use of potential. When you get a good man who seems to have the potential, tell him his responsibilities, let him know that if he wants advice and guidance there is somebody to whom he can turn—and then leave him alone and do not interfere.'

From a paper to the Eastern Junior Gas Association, at Thetford.

Oil gasification—Thetford

By M. F. HULL, A.M.I.MECH.E., ASSOC.M.INST.GAS E., A.M.INST.F.
PRODUCTION ENGINEER, NORWICH DIVISION,
EASTERN GAS BOARD.

IN September 1954, it was decided to inter-link Brandon with Thetford and to continue manufacture at Thetford by installing what was then a relatively new type of gas-making unit—a catalytic oil gas plant.

In deciding the capacity of the new gasmaking unit, consideration was given to the possible increase in demand which could result from the Thetford Borough Council's negotiations with the London County Council to take the 'overspill' of people and industry under the Town Development Act. The manufacturing plant which was finally installed, consists of duplicate units of Humphreys & Glasgow Onia Gegi regenerative type oil gas plant, designed for operation on heavy fuel oil. Each unit has a capacity of 300,000 cu.ft. per day, and two units were necessary in order to ensure continuity of supply, so that maintenance could be carried out on one, while the other was in continuous operation.

Declared calorific value

In view of the change of plant, together with the inter-linkage with Brandon, the opportunity was taken to re-declare the calorific value for Thetford to 480 B.t.u. per cu.ft. in place of the old standard of 460 B.t.u. per cu.ft. Brandon was not working to a declared calorific value prior to the bulk gas supply being made available.

The two gas-making units at Thetford consist of three vessels, an air regenerator, a catalyst vessel and a steam preheater. The plant is automatically operated by a Humphreys & Glasgow six-point mechanical operator, similar to that used on many water gas plants. A system of mechanical/hydraulic interlocks has been incorporated to make sure that the plant blast valves, including the burner air valve, cannot be opened unless the stack valves are open. Likewise, the stack valves cannot be closed unless the blast valves are fully shut.

It was decided to install two Steambloc Model 120 boilers, each rated to produce 3,000 lb. of steam per hour (from and at 212°F.) with a working pressure of 120 p.s.i.g. The rated output from these boilers is the nearest to the actual steam demand that could be obtained from a standard boiler unit.

Each package boiler unit is complete with oil heater, steam and/or electrically operated, and both are thermostatically controlled: A forced draught fan providing combustion air and thus obviating the use of an induced draught fan and large chimney. The boiler feed water system includes a small supply tank and an electrically driven feed pump with a standby steam operated injector. There is a control cabinet housing electronic and electro-mechanical devices which operate the boiler according to the steam demand and shut down the unit in case of flame failure, low water or excessive steam pressure. The boiler water obtained from a borehole on the works, is softened in a base exchange plant designed by Permutit.

The mechanical operation of the plant has been very satisfactory. The duration of the cycle of operations is 7.93 minutes.

Primary and burner air valves tended to stick after each daily shut-down, but it has been possible to free these easily by the use of some live steam before starting up the plant. The primary air valve has to be well lubricated with creosote to keep it from 'grabbing' on the wedges, due to tarry deposits. The butterfly valve above the washer required cleaning every day during the initial period of start-up, but now it only requires cleaning once a week.

The efficiency of the plant assessed in therms per gal. of make oil varies between 1.1 and 1.25 generally according to the time of the year. This factor does change with the amount of gas required.

There are three charges of catalyst available at Thetford, two always in one or other of the gasmaking units and the third held in reserve. Each charge comprises 30 cwt. of material which has a nickel content of approximately 2%.

Re-screening of the catalyst was carried out regularly when gasmaking units were changed, but in the light of subsequent experience the catalyst is not disturbed unless there is some firm evidence of pressure building. The less the catalyst is moved, the better. Between 3 to 5 lb. of fine material has been removed when screening a charge of catalyst.

When the plant first started up, it was agreed that two men per shift would be used and undoubtedly it was a sound decision. Now that the plant has settled down, one man can comfortably control the gas-making and steam-raising plant. Alarm buttons have been fitted throughout the plant and these ring a bell in the foreman's house so that help can be summoned in the event of an accident out of normal day working hours.

Present labour force

The present labour force of operator/labourer, because all the work is shared equally, is four, in addition to the works manager and the works foreman.

In the initial period following start-up, tar was quite a problem to handle, containing as it did much free carbon and water. When the oil feed stock source was changed from Venezuelan to Middle East, the condition and type of the tar improved. Quite soon after the plant had been put to work, tar was used for heating and no major difficulties were experienced and, further, none have arisen subsequently.

It has been found advantageous to add Bitran T.C. to the tar in the separator to assist in separating the water content. About 1½ pints per week were added.

When the plant is operating using heavy oil as feed stock, during the gasmaking period carbon is deposited in the

steam regenerator. In theory the carbon should be burnt off during the blow period.

The plant was originally designed with firebrick checkers in the steam regenerator, spaced relatively close together. As has been found on other plant, the top rows of checkers very soon disintegrated under the constant fluctuations of temperature and oil spray conditions. Alternative type firebrick checkers have been tried with little improvement. Subsequently, however, chrome steel checkers have been made available and these are now in use in No. 2 unit. At the same time much wider spacings between the lower rows of refractory material have been allowed and in general, it would appear that we are getting a 'cleaner' steam regenerator as a result of this modification.

Cooling and cleaning of the make gas is effected by a tar scrubber cooler, followed by a cyclone tar extractor. This consists of a steel vessel filled with wood grid packing, over which water is passed. The rate of water flow is of the order of 34 gal. per minute of the make period and the outlet gas temperature in the region of 70° to 80°F.

Circulated cooling water

The cooling water is circulated and cooled by passing through an induced draught cooling tower. Between 40 and 50 gal. per hour of water is required to replace the bleed to the sewer, which is necessary to keep the chemical composition of the circulating water reasonable. Dosing with soda ash is necessary and roughly 15 lb. is added to the circulating system per day.

The naphthalene washer is a standard four-bay Holmes Multi-film unit again with wood packing and using creosote as the washing medium. The initial supply of creosote was not suitable and a fresh source had to be located. The creosote obtained from this second source has resulted in an improvement of the naphthalene content of the gas. The creosote rich in naphthalene is put into the tar separator and fresh creosote added; usually 10 to 12 gal. per day are sufficient.

The Steambloc package boilers have worked very well since the initial start-up. Occasionally there has been the trouble which could be associated with this type of plant: Something happens for no apparent reason, the boiler burner fails to cut in or cut out at the correct time and time can be lost in tracing the fault, but the automatic controls fitted to these boilers do make them very useful for this type of installation. Their main drawback is the lack of steam space above the tubes. The overall efficiency is very reasonable and the average CO_2 content of the waste gases is 10.5%.

One problem associated with heavy oil feed stock is sulphur. Estimates of the SO_2 content of the make gas leaving the plant are at the outlet of the washer, 65-75 grains per 100 cu.ft., and at the outlet of the holder, from 60-70 grains per 100 cu.ft.

Organic sulphur is fairly constant at about 18 grains per 100 cu.ft. in the town gas. About 3 grains per 100 cu.ft. of naphthaline are present in the town gas.

The production of town gas from heavy oil has proved to be quite satisfactory, supplying Brandon and Thetford Districts. The overall efficiency of the process for the year is about 63% on a therms-out/therms-in basis and compares reasonably well with a small horizontal or small c.v.r. installation. If it were not necessary to close down each day, it would be possible to obtain efficiency with the catalytic oil plant of the order of 70%.

The production costs at 17.51d. per therm compares well with costs at other small works and, in fact, will show some improvement following the recent agreement for a 42-hour shift week, since we have not found it necessary at Thetford to increase the labour force, whereas at several of the smaller works it has been necessary to take on additional labour. In addition, coal prices are tending to go up while oil prices appear to be fairly stable.

DISCUSSION

The President of the Association, **Mr. D. G. Simpson,** Luton, opened the discussion by asking if the present plant capacity would be sufficient to meet future loads.

Mr. Hull said in reply that this was dependent upon the efforts of our salesmen. It was the winter peak demand which would have to be carefully watched.

Mr. R. M. Birchall, Dunstable, asked whether there had been any trouble with smut emission from the stack, whether the sulphur dioxide content of the make gas was high, and whether any steps had been taken to prevent internal corrosion of the district mains.

Mr. Hull replied that there was no trouble with smuts from the stack, but considerable difficulty was experienced with downdraught. The stack was really too large and, therefore, the air velocity in it was low. A restrictor in the top of the stack had been fitted which increased the gas velocity from 4 ft. per second to something like 40 ft. per second, in an effort to send the products higher. With regard to the sulphur dioxide content, no steps had been taken to reduce this, but most of it was absorbed in the purifiers.

Mr. N. A. Williams, Peterborough, said that the effluent toxicity seemed low, and asked whether there was a limit imposed by the Local Authority.

Mr. Hull said in reply that actual limits had not yet been imposed. Negotiations were in progress regarding effluent discharge but, in the meantime, water was continuously added for dilution to ensure a reduction in the sulphite content which attacked the concrete sewer ducts.

Mr. R. A. Janes, Dunstable, enquired as to the life of the catalyst, either in millions of cu.ft. or the number of days operated, and asked whether the depreciation of the catalyst was included in the cost of gas into holder.

Mr. Hull replied that the depreciation was included in the pence per therm cost into holder. The cost of the catalyst was being written off over a definite period, but they had no clear idea yet as to how long the catalyst would last. Its efficiency had not so far been reduced, and rescreening was only necessary to eliminate the dust collected in the catalyst bed.

Mr. A. E. Tate, Norwich, asked what caused the change of creosote for naphthalene washing.

Mr. Hull replied that the first batch of cresoote was already too high in naphthalene content. That now in use was almost completely naphthalene-free.

Mr. E. Williams, Norwich, said that there was still much to be learned about the oil gas plants. The problems encountered at Thetford were probably different from those at other places. There had been little trouble with the plant so far, the only major trouble was the down-draught from the stack causing complaints of fumes by local residents within about 200 yards from the works. The complete solution to this had not yet been found. They had considered the use of p.f.d. instead of heavy oil, but this would probably not provide the answer. The provision of a smaller stack was now under discussion. The restrictor in the existing stack had helped but was not a complete cure.

Mr. R. A. Janes, Dunstable, said that at Dunstable smuts did not originate from the plant itself but from the boiler plant. The cause might be too low a temperature at the stack outlet, but the matter was still being pursued.

It was unusual at Dunstable to see black smoke on the heating part of the cycle—only on the purge period normally.

Mr. Hull said he thought the steam regenerator temperature was too low at Thetford, but this was limited by the necessity of keeping the catalyst temperature within bounds. He had heard that at Dunstable fusing of the catalyst had taken place through excessive heat.

Mr. R. A. Janes, Dunstable, added that it was only at the very end of the useful life of the catalyst that fusing had appeared.

Mr. B. Santo, Peterborough, asked whether any naphthalene deposits had been found in the integration main, since the naphthalene content of the gas seemed high.

Mr. Hull replied that they had had no trouble so far. Some hydrocarbons had condensed out after compression, but, in any case, the gas was no doubt more free from naphthalene than when the old horizontal retort plant was in use.

Mr. F. A. Rhead, Cambridge, asked whether full production from the plant could be maintained once it was started up, or were there numerous shut-downs for short periods for repairs and adjustments. How effective was the addition of the agent Bitran T.C. in assisting the separation of the water from the tap.

Mr. Hull replied that there had been very few shut-downs. It was necessary to clear carbon deposits from the burners each morning, after which the plant operated without interruption throughout the day. The agent Bitran T.C. had proved very effective, the water content having been reduced from 35% to 1.6%.

Mr. R. F. Saggers, Ipswich, asked whether difficulties had been experienced with the Venezuelan oil, causing a change to Middle East oil.

Mr. Hull replied that there were no really technical reasons for the change, but they had found the Middle East oil generally more suitable.

Mr. J. T. Brookes, Norwich, spoke of the discussion with the London County Council regarding the extent of the overspill for Thetford. He thought the rate of population increase would be considerable, and asked whether any extension to the plant would be necessary, and what steps could be taken to take care of the increased demand.

Mr. Hull said the plant output could be extended by propane addition or, depending upon the demand, a further unit could be added.

BOOK REVIEWS

TINPLATE TESTING—CHEMICAL AND PHYSICAL METHODS

By W. E. Hoare, and S. C. Britton

WRITTEN for those in the tinplate manufacturing and using industries responsible for the quality appraisal of tinplate and the determination of the suitability of particular grades for specific uses, this handbook is limited to a study of the superficial layers of the tinplate and so does not describe mechanical testing procedures.

Quality test methods for thickness and continuity of the tin coating, and the determination of the oxide and oil films are discussed and compared; also performance tests for rust resistance, staining, lacquerability, solderability and corrosion.

Since the pre-eminent characteristic of tinplate is undoubtedly the thickness of the tin coating, three of the 14 appendices describe thickness tests; the remainder deal with tests for the other qualities enumerated above.

Adequate detail is given, aided by 24 illustrations and diagrams, to enable laboratory technicians to mount and carry out the tests.

Copies are available from Tin Research Institutes throughout Europe, and also in the U.S.A. and Canada.—

TIN RESEARCH INSTITUTE, FREE OF CHARGE

FUEL CELLS: POWER FOR THE FUTURE

THE first comprehensive study of fuel cells has recently been published, and presents an economic and technical analysis of developments and opportunities in the field of electrochemical fuel cells.

The authors, nine graduate students at the Harvard Business School, now considered experts in the fuel cell field, spent almost a year interviewing leading scientists in the field, reviewing current papers on fuel cells, and analysing the activities of companies doing fuel cell research. They travelled over 10,000 miles to gather the information necessary for the study.

Prior to final publication, the report was reviewed by leading electro-chemists, engineers, and businessmen, who expressed praise for the study. They feel that it presents authoritative conclusions and predictions concerning the economic future of the fuel cell.

Fuel cells are sources of power which convert chemical energy of fuels directly into electrical energy at efficiencies of 50 to 85%, and are definitely not in the class of exotic power sources; they should soon play a major role in industry.'

At present, there are several fuel cells being considered for commercial application. The Harvard Business School study presents a rigorous analysis of these cells, along with analyses of predicted near-term and long-range fuel cell developments. At present the most practical cell, according to the report, is Union Carbide's hydrogen-oxygen fuel cell. Companies whose fuel cell work is analysed and discussed in the report include Electric Storage Battery, General Electric, Monsanto, Esso, Allis-Chalmers and many others.

The authors indicate, with extensive supporting data, that in this decade fuel cells will find widespread application in powering fork lift trucks, town delivery trucks, heavy construction equipment, tugboats, ferries, taxicabs, and perhaps automobiles and locomotives. Not every application studied was found suitable for fuel cells. For instance, the practicality of using fuel cells to power aircraft and high horsepower outboard motor boats is extremely doubtful.

Fuel cells may also cause a trend towards small electric power stations, since the low capital requirements for small (fuel cell) generating stations should help to provide many areas of the world with badly needed electric power.

Though excellent results are being obtained with fuel cells using hydrogen and oxygen, use of less expensive fuels such as hydrocarbons (propane, ethane) and air will have to be achieved before they are widely acceptable.

FUEL CELL RESEARCH ASSOCIATES, P.O. BOX No. 157, CAMBRIDGE, MASS., U.S.A., PRICE $18.75

Gas in the Soviet Union

Burners for industrial furnaces

INJECTION-TYPE burners can be recommended for reheating and heat treatment furnaces in which the pressure in the working space varies within the limits of .04 in. w.g. up or down. The working gas pressure before the nozzle must be higher, the wider is the required range of regulation for the burner capacity. At a gas pressure of 12 p.s.i. the range is 1 to 4 and at 3 p.s.i. only 1 to 2.

The primary coefficient of air consumption must be chosen with due regard for the working pressure of the gas and is should be 1.05 for a maximum pressure of 12 p.s.i.

Injection burners may work with air preheating in heat exchangers and the lower the flow resistance of the latter, the lower the gas pressure need be for normal operation of the burners.

From the two sources of noise in injection burners, the resonance can be completely eliminated by matching the geometrical characteristics of the tunnel to those of the furnace. The second source, caused by the air and gas motion, can be reduced considerably by a good finish to the mixer and nozzle and by the correct selection of the gas pressure. *A. E. Erinov. Gazovaja Promyshlennost.* (Gas Industry), May, 1960, **5,** 27.

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Higher town gas pressures

THE low pressure gas distribution network in Moscow is unable to cope with the large increase in gas consumption by domestic customers since the advent of natural gas, and a study has been carried out on the optimum working pressure for the most popular gas appliances.

In domestic cookers and water heaters, natural gas was found to burn best at 5 in. w.g. pressure. Slightly smaller burner nozzles and primary air passages allow, however, a higher optimum pressure.

The present permissible pressure variations are 50% down and 35% up. A higher nominal pressure in an existing system has been confirmed to widen the range of stable operation of the domestic appliances. A rise from 5 in. to 8 in. w.g. increases, on the other hand, the flow capacity of the system by 25%. In new systems, a higher pressure can employ decreased-diameter pipes because a higher pressure drop can be accepted.

The technical council of the Ministry for Municipal Economy has recommended that the pressure drop in the principal gas mains should be 70% of the total, and that in the consumer connections and inside the premises 30%. Since an increase in the nominal gas pressure at the domestic appliance to 8 in. w.g. allows the maximum permissible pressure at that point to be 10½ in. w.g., the State Construction Council in Moscow has raised the permissible pressure in low pressure gas mains, when fed with natural gas, to 12 in. w.g.—*P. B. Maizel and L. I. Druskin, Gazovaja Promyshlennost.* (Gas Industry), May, 1960, **5,** 23. No. 5.

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Internal corrosion of gas mains

THE life of the mains in one of the Russian natural gas distribution districts varied from three months to ten years. This difference in the aggressive attack by corrosion is thought to be mainly due to variations in operation and lay-out, and the worst affected sections were traced to be those on contact with condensate from the gas. This condensate accumulates on the falling sections of the main and consists as a rule partly of liquor and partly of a light oil.

Although the liquor, which contains a fair amount of salts and has a low *p*H-value, represents a highly corrosive electrolyte when in presence of hydrogen sulphide, the most aggressive action on steel pipes was in fact observed for two-phase condensates.

The author recommends therefore that any such schemes for the transport of aggressive gases should avoid the precipitation of large amounts of condensate or that condensate drains should be placed at points where heavy accumulations cannot be avoided. In every case condensate should be removed at regular intervals.—*A. A. Gonik Gazovaja Promyshlennost.* (Gas Industry), 1960, **5,** 51.

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Freezing trouble with liquefied gas

DIFFICULTIES have arisen in Russia with frozen parts in tank cars used for the transport of liquefied gas. One way of freeing the obstruction is to introduce 3 to 4 pints of methyl alcohol which dissolves any frozen stoppage in ten to 15 minutes. Another is to thaw it by a special steam heater placed underneath the tank on the railway track. It is connected to a low pressure (10-p.s.i.) steam supply by a flexible hose.—*L. B. Kontorer. Gazovaja Promyshlennost.* (Gas Industry), March, 1960. **5,** 30.

Gas versus electric heating

GREAT progress has been made in Russia in the design of gas furnaces, specially those suitable for natural gas firing. The quality of the work from gas furnaces for non-oxidising heat treatment exceeds even that of the electric induction furnace and it is far superior as far as fuel consumption is concerned.

The main advantages of gas furnaces over electric furnaces are stated to be their simplicity, small capital outlay and low material and labour costs for their installation.

The specific fuel consumption for gas heating is proved to be usually less than the consumption of primary fuel under the boilers of a thermal power station.

The natural gas deposits and long-distance gas grids in Russia have given a new impetus to the application of gas to industrial heating, specially in the cement and ceramics industry.—*A. A. Shtshukin and A. A. Shtshukin jun. Gazovaja Promyshlennost* (Gas Industry), June, 1960, **5**, 20.

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Temperature measurement by thermistors

THE temperature of high-pressure gas in a pipeline is usually measured by a thermometer in an oil-filled pocket, but the drawbacks of this method are the slow response and the large error involved. The Kuibyshev Institute in Moscow has therefore worked out a method which is based on the use of 'thermistors,' *i.e.*, semiconductor resistances.

The main advantages of the thermistors for this purpose are their high negative temperature coefficient of resistance (usually 3% to 4%), their high ohmic resistance and their minute dimensions.

The thermistors are inserted into the pipe by means of a hollow bolt. Check measurements have confirmed that the absolute divergence of the temperature readings does not exceed .1 to .2°C.—*A.V. Minajev. Gazovaja Promyshlennost (Gas Industry), April, 1960,* **5**. p. 24.

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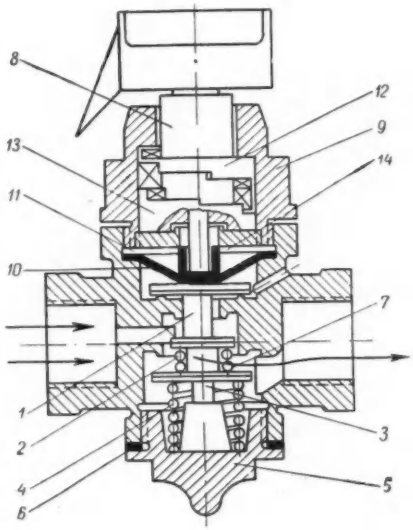
Gas cocks from plastic

THE domestic appliances which are fitted with main and pilot burners need either gas cocks which are interlocked with each other or one special cock to ensure the proper sequence between pilot and main gas flames.

The workshops of the Kharkov Gas Board have designed a cock of the latter type which is shown in cross section in the illustration. This cock is suitable for ½-in. gas pipes and is made from the plastic material Kapron. Large numbers of them are already installed in Kharkov and Kiev and have given satisfactory service.—*N. A. Venediktov, P. Y. Aframovitch and V. M. Fursajev, Gazovaja Promyshlennost* (Gas Industry), June, 1960, **5**, No. 6, p. 32.



Legend:—

1 Upper valve member.
2 Middle valve member.
3 Lower valve member.
4 Spring.
5 End cap.
6 Washer.
7. Spring.
8. Spindle.
9 Top cap.
10 Membrane.
11 Metal ring.
12 Upper coupling half.
13 Lower coupling half.
14 Membrane spindle.

BOOK REVIEW

FEDERATION OF CIVIL ENGINEERING CONTRACTORS' HANDBOOK

THE 1960-61 edition of the handbook of the Federation of Civil Engineering Contractors published recently, contains all the main Federation documents, including the Working Rule Agreement of the Civil Engineering Construction Conciliation Board, the I.C.E. Conditions of Contract and the Federation Dayworks Schedule, together with alphabetical and sectional lists of the 690 members of the Federation.

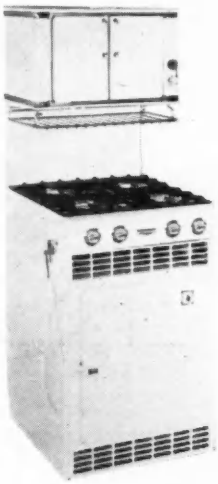
Copies of the handbook may be obtained, price 12s. 6d. each including postage and packing, from the Federation of Civil Engineering Contractors, Romney House, Tufton Street, Westminster, S.W.1.

DOMESTIC Technical developments

CannonLux cooker/'fridge

THE first combined complete gas cooker and refrigerator unit has been produced by Cannon (GA) Ltd. and Electrolux Ltd. Known as the CannonLux, it is the perfect answer to the problem of accommodating a cooker and a refrigerator in the small kitchen.

The CannonLux has a large size four-burner hot plate and a combined oven and grill chamber, made by Cannon, and a space-saving Sixteen gas refrigerator of 3½ sq.ft. shelf area and 1½ cu.ft. capacity made by Electrolux. These



are both combined into a unit taking a floor area of 21 in. by 25 in., no more than is occupied by an ordinary cooker. It is designed to fit flush to the wall to save space and avoid the dirt trap between wall and cooker.

The hotplate is mounted over the refrigerator 34 in. from the floor. Its design provides a large-size cooking area of 20¾ in. wide by 20½ in. deep and its four hotplate burners accommodate four 10 in. pans, and light automatically. The two back burners are specially designed for simmering. The hotplate is completely sealed to prevent spillage seeping below the vitreous enamelled hotplate dish.

The oven is situated over the splashplate. Compact in design but large enough to cater for a family party, the oven has twin doors which do not project over the hot plate when they are open. A grill chamber is quickly formed by fitting a removable grill into the top of the oven. It is easily and quickly slid into position on the top runners and removed again when the oven is required. A specially designed locking device prevents either the grill or oven burner being turned on when the other is in use. A plate shelf is fitted under the oven and has room for between six and eight plates. It can be drawn forward to provide a useful working shelf when the oven or grill is in use.

Instead of the oven-grill chamber, the CannonLux can be supplied complete with the Cannon foldaway high level grill, which can be folded into the splashplate when it is not in use. This model can also be supplied with a separate oven which can be fixed to the wall alongside the CannonLux, or in any convenient position in the kitchen. It can have a platerack fitted over the hotplate, and for this model a combined oven and grill chamber is available as a separate unit for fitting to the wall.

The Electrolux built-in gas refrigerator is fitted as standard with all alternative cooker specifications.

The CannonLux will be available shortly from all gas showrooms in either all-white or all-cream finish that is easy to keep clean.

The price of the basic unit with combined oven and grill chamber is 72 guineas.

Gas-fired incinerator

DIFFICULTIES encountered in disposing of refuse, and at the same time complying with the Clean Air Act, have long been thorns in the sides of municipal authorities.

An answer to these problems is the gas-fired incinerator, a recent example which has been produced by Victor Products (Wallsend) Ltd. They announce a compact 1.6 cu.ft. capacity appliance in which combustible waste material, either wet or dry, is completely reduced to ash.

The Victor incinerator, which costs 69 guineas, will be marketed by the Northern and North Eastern Gas Boards,

and will be available initially only in the areas covered by these Boards.

Operation is entirely automatic and, as there are no moving or electrical components to wear out, maintenance is virtually nil.

Connection to the gas supply is no problem. A ½-in. supply can be connected from either side or underneath.

Operation is completed in two simple actions: (1) The tip-toe foot pedal is depressed which raises the lid to take the waste material, leaving both hands free; (2) the dial

is set for the burning period required when the main gas burner is automatically lit.

Combustion is rapid and constantly controlled by a sensitive, self-regulating draught stabiliser, while smoke and fumes are drawn by air turbulence into a second chamber. In this 'smoke chamber,' lined with firebrick and operating at 800°C., the products of combustion are superheated and rendered smokeless and odourless.

Cool air, introduced via the draught stabiliser, mixes with any gaseous left-over products and disperses all remaining fumes. The result is a completely smokeless and odourless process which leaves only a small quantity of ash to be periodically removed from a drawer at the front of the incinerator.

When combustion is completed the burner is automatically extinguished by a timing control which incorporates a relay valve and pressure governor for automatic shut-off in the event of flame failure.

The burner shield and other parts in flame-contact are made in heat-resistant stainless steel. All incinerator components, including the ash drawer, gas controls, etc., are readily accessible on removal of the front panel.

The incinerator casing is fully insulated by reflective foil on asbestos.

Domestic boiler from Perkins

THE Perkins Paramount domestic gas-fired boiler has been developed from the Paramount boilers used in industry and agriculture. The Gas Council has approved its design and high efficiency rating.

The boiler is constructed of high quality boiler steel with multi-horizontal water tubes so arranged that no hot gases pass into the flue without having first been in contact with water backed heat transfer surfaces. Adequate insulation is fitted round the boiler to reduce heat loss to a minimum. A detachable insulated cover fits over the top of the boiler and allows access to the whole width of the inside of the combustion area for cleaning.

The boiler and controls are enclosed in a white stove enamelled sheet steel casing with stainless steel fittings. This outer case can be removed in seconds to allow complete and uninterrupted access to the whole unit for maintenance.

Dual flow and return water connections are fitted to allow the operation of thermo-syphon water heating on one loop and the connection of a central heating circuit on the second loop. The boiler is fitted with an adjustable thermostat and flame failure device.

The 50,000 B.t.u model, fitted with small bore circulator, electric switch, temperature gauge, and time clock, inclusive of wiring and piping, costs £99. Without the circulator, switch, temperature gauge or time clock, the price is £54. Models rated at 75,000 and 100,000 B.t.u. are available but not yet tested by the Gas Council.

Parkinson Peeress cooker

THE unusually styled Parkinson Cowan Peeress is a compact gas cooker with the features of the larger luxury models but selling for less than £30. A distinctive contemporary appearance with a wide selection of colours enables the Peeress to combine attractively with modern kitchen units.

The high level grill at a convenient working height is large and capable of cooking a meal for four people in 10-25 minutes. The platerack with space for six dinner plates can be removed easily for cleaning.

The spacious hotplate is fitted with three full-size boiling burners which are self lighting and can all be used for fast boiling or simmering. They are controlled by 'push and turn' safety taps. A gas torch is provided for lighting the grill and oven burners and is included in the price.

A large oven—in fact the largest oven in the small cooker range—is controlled by the Ajusto combined oven tap and thermostat. In addition to full range of settings on the thermostat there is an extra 'low' setting well below the average quarter setting. This setting is especially suitable for slow cooking, specialised cooking such as meringues, or for warming plates. With slow cooking, a meal such as a casserole dish can be left cooking for 3-10 hours. The oven shelves are a safety type which can only be pulled out so far and will not tip. To remove them completely they have to be raised and lifted clear.

The Peeress stands on tubular metal legs which are fitted with adjustable feet so that the cooker can be levelled easily on the most uneven floor. It is a simple matter to keep the floor clean around the cooker; there are no hidden grease traps. Other aids to easy cleaning are a removable grill cover, a large smooth tray to catch hotplate spills and a well-rounded oven.

The selection of colour finishes is wide, white or cream vitreous enamel with a choice of red, green, blue, white or cream for the grill pan, control panel, door knob and legs.

National Coal Board chief says—

'WE ARE PREPARED TO TEST LURGI PROCESS'

THE National Coal Board has made known to the Minister of Power and the Gas Boards its interest in the development of total gasification of coal by the Lurgi process and is prepared, if the need arises, to participate financially, as well as in other ways. This is the gist of an answer by the Chairman of the Coal Board, Sir James Bowman, to a Press question.

Sir James also said: 'I think this is very much the subject of current consideration. That is why I make the point that the N.C.B. believe that there should be no question of bringing into this country methane until it can be clearly established that it can be done at an immeasurably better rate than we can gasify coal in this country.

METHANE

'There are also many considerations associated with the importation and the dependence of this country on methane imported from abroad. Political, economic and strategic considerations must be taken into account.

'We are prepared, as a first measure, to say that we are willing, jointly or singly, to test out this Lurgi process and to seek to establish that we can in this country gasify coal economically at a price that will compare favourably (with other methods).'

The improvements achieved through rigid economy and a high rate of efficiency, represented savings in 1960 at the rate of about £50 mill. a year, compared with 1957, said Sir James.

It is estimated that, subject to any unforeseen changes in the economy, total consumption in 1961 will be about the same as in 1960.

The technical and sales service which was introduced towards the end of 1959 has proved immensely popular and its staff is being augmented to meet the increasing demand by consumers.

The Board's advertising and publicity campaigns will be further increased in 1961 and the Board will themselves initiate research work on combustion equipment, and sponsor new developments in this field.

Small quantities of their new smokeless fuels from the two pilot plants will be available for testing in various ways.

PEAK EFFICIENCY

Efficiency is now at the highest peak ever reached, and higher levels will be attained in 1961, when there will be a further rapid increase in mechanised output and concentration of working, the statement says. The industry will improve its competitive strength during this year.

NEWS SUPPLEMENT

A ROYAL OCCASION

THE QUEEN, ACCOMPANIED BY THE DUKE OF EDINBURGH, WILL OPEN THE LURGI GASIFICATION PLANT AT WESTFIELD, FIFE, ON JUNE 27.

MOTHERWELL WORKS WILL CLOSE

Motherwell gasworks is to be closed.

The date has not been fixed, but it will not be later than March 31 and about 30 of the 70 men employed at the works may be declared redundant.

An official of the Scottish Gas Board said that the closure was in line with the Board's policy of integration, which was designed to provide a better supply of gas from more modern and economic undertakings and to give a more regular supply to many isolated places.

Since the Board took over in May, 1949, they have closed 95 of the 196 manufacturing stations in their area.

Motherwell gasworks has been in existence for more than 100 years. Gas will be supplied eventually from the Glasgow grid to Motherwell.

PIPE PICK-UP POINT

A helicopter has been used to lay 2,000 ft. of 8-in. steel pipeline for the Associated Portland Cement Manufacturers Ltd., across the Thames Marshes at Cliffe, near Gravesend, Kent.

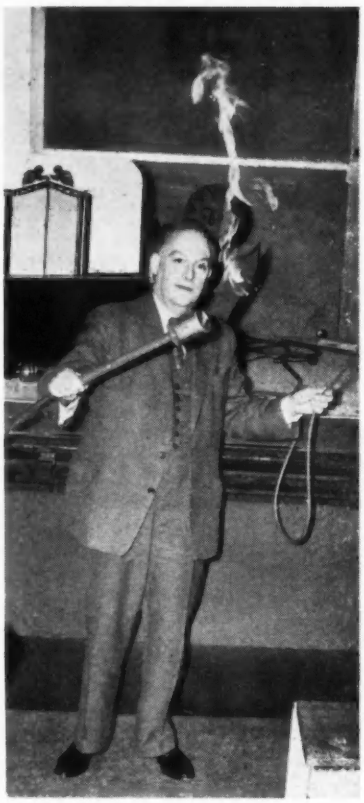
The contract, worth about £3,000, was awarded to the Le Bas Tube Co. Ltd., who supplied the pipe and planned the whole of the operation.

The helicopter was a British United Airways Westland Widgeon, piloted by ex-Navy pilot, Mike Perkis.

A hover-plane was chosen for the job rather than heavy land transport because of the boggy nature of the ground over which the pipe was being laid.

Taking off from a hard roadway, it made numerous four-minute trips, carrying each time a 20-ft. section of pipe, weighing 440-lb., and lowered them on to the marsh, where they were bolted together.

This was the first time that a helicopter had been used for such an operation in Britain.



The Chief Chemist of the Southern Gas Board, Mr. W. F. Thorne, demonstrates one of the largest industrial jets during a lecture at Oxford, when pupils from schools in Berkshire and Oxford attended the I.G.E. (London and Southern Section) demonstration on 'Flame'. Six sessions over three days were necessary to accommodate all the young people.

Explosion flings oxide dust—2 hurt

TWO men were taken to hospital as a precautionary measure following an explosion at Coleraine gasworks.

The explosion occurred when a purifier box was being cleaned out. It was followed by a fire which the employees extinguished before the arrival of the fire brigade. The brigade covered the area with foam as a precautionary measure.

Mr. T. Cameron, Manager of the undertaking, which is owned by Coleraine Borough Council, was near the tank when the explosion occurred.

He described it as a dull thud, and said a probable explanation was that a pocket of gas in the tank had become ignited by a spark.

The explosion blew iron oxide dust into the eyes of two of six men who were at the scene, and they were taken to Coleraine Hospital for attention, but were not detained.

£2.5 mill. natural gas pipeline contract for British firm

A CANADIAN contract worth £2.5 mill. for 53 miles of flexible submarine pipeline to supply natural gas from the mainland of British Columbia to Vancouver Island has been secured by British Insulated Callender's Cables Ltd.

At a London Press conference, The Guardian (Manchester) reports that Sir William McFadzean, chairman of the company, said the contract was another big 'first' with tremendous potentialities for Britain.

The deciding factor had been that the British company was the only one in the world making flexible submarine pipeline. The Americans and Canadians could offer only rigid steel pipes.

The development had tremendous potentialities, he said, when one considered proposals for transmitting natural gas across the Mediterranean to Europe from North Africa.

AT MANCHESTER

The manufacture of the flexible pipe will be undertaken by British Insulated Callender's (Submarine Cables), Ltd., at Trafford Park, Manchester, and the installation by the group's construction company.

The pipeline is a development of the wartime Pluto pipelines which carried petrol under the Channel during the Normandy landings.

Full scale sea proving tests are planned for early next year, and the pipe will be laid in 1963. It will be capable of transmitting about 50 mill. cu.ft. of gas in 24 hours.

PIPE SIZE

Each pipe will have an external diameter of 7.5 in. and will operate at a gas pressure of 1,500 p.s.i.

The maximum depth of laying will be about 810 ft.

The pipelines will be laid across the Georgia Strait, which separates Vancouver Island from the mainland.

The pipes will be laid in continuous lengths across the strait passing through two intermediate islands which will be crossed with conventional steel pipes.

Presentations to three North Staffordshire gas workers for 25 years of service, were made at Newcastle-under-Lyme. The presentations were made to Mr. G. W. Roberts, Mr. N. Rogers, and Mr. F. Stubbs.

WILDCAT GAS PLANT MOVE

A GROUP of five companies has applied to the Alberta Conservation Board for permission to build a $6 mill. plant to process gas from Alberta's wildcat Hill Fields.

The applications have been filed by Western Leaseholds, a subsidiary of Canadian Petrofina, on behalf of itself, Imperial Oil, Shell of Canada, British American Oil and Hudson's Bay Oil and Gas, says the *Financial Times*.

The proposed plant would be located about 35 miles north-west of Calgary and would include facilities for gas treating, hydrocarbon recovery and condensate stabilisation, as well as a sulphur recovery unit.

Southern catering exhibitions

THE Southern Gas Board is sponsoring a number of local catering exhibitions later this month and through February.

Although most of the Board's showrooms always display a useful stock of commercial catering appliances, these exhibitions enable the Board to show a far wider range, and one which it would be quite impractical to keep in every locality as a permanent display.

The programme is as follows: Weymouth, Gloucester Hotel, January 23-27; Southsea, Minor Hall, South Parade Pier, February 13-17; Reading, Small Town Hall, February 20-24; Oxford, Southern Gas Service, Demonstration Theatre, Therm House, Oxford, February 28-March 3.

The Board is also taking part in the following exhibitions, sponsored by other local bodies: Swanage Hotel Association's Exhibition, February 8-10; Bournemouth Private Hotel and Guest House Association's Exhibition, February 14-17; Bournemouth International Competition Culinaire & Trade Exhibition, February 21-25; Ryde Catering Exhibition, February 27-March 3.

CORRESPONDENCE

DEAR SIR,

Referring to Mr. J. W. Hyde's letter in your issue of January 11, quite clearly your report was meant to imply that the N.W.G.B. 'Stretford' system would be suitable for H_2S removal from the oil industry's liquid products, *after the latter had been reformed.*

They contain organic sulphur compounds which on reforming give rise to H_2S, but which is not present as received.

Yours sincerely,

K. W. FRANCOMBE.

Whessoe Ltd.,
Darlington.

PERSONAL NOTES

MR. H. MARTIN, home sales manager of Murex Welding Processes Ltd., retired in December, 1960, after 38 years service in the Company. MR. R. E. H. BELL, assistant home sales manager for the past ten years has been appointed Home Sales Manager. MR. K. LEEVERS, and MR. P. HOBBS, have been appointed Assistant Home Sales Managers (Technical). MR. S. E. SMITH has been appointed Plant Sales Manager.

MR. B. N. JOLLY has been appointed Managing Director of E. Boydell and Co. Ltd., to succeed the founder of the company, MR. E. BOYDELL, who will remain as Chairman. Following the acquisition of the equity of the company some 12 months ago by Winget Ltd., MR. R. DUCAS, Chairman of Winget, and MR. E. F. O. GASCOIGNE, Deputy Chairman, are also joining the Boydell Board.

MR. STANLEY ARMITAGE, regional sales manager of Parkinson Cowan Gas Meters for the West Midlands, Wales and South Western Gas Boards, has been appointed Sales Manager of Parkinson Cowan (Canada) Ltd. MR. A. L. WEST will assume responsibility for the South Western Gas Board and MR. C. VARCOE for West Midlands and Wales Gas Boards.

MR. E. CROWTHER, Chairman of the Northern Gas Board, presented long service awards at Newcastle to 21 employees of the Tyneside Division who had completed 40 years service.

COMING EVENTS

January 26.—NORTH THAMES G.C.C.: City Hall, Westminster.

January 30.—EASTERN G.C.C.: Connaught Rooms, Great Queen Street, London, W.C.2. 2 p.m.

January 30.—I.G.E., EASTERN SECTION: Caxton Hall, Caxton Street, London, S.W.1. Joint Meeting with London and Southern Section. 'The Supply of Natural Gas from Lacq and the Sahara.' 2.45 p.m.

'Consider Clegg . . .'

DEAR SIR,

Further to the article in your issue of January 4, the first undertaking to supply gas beyond its own premises—The Chartered Gas Light and Coke Company —came into being in 1812 and in that year appointed Samuel Clegg its Chief Engineer. He was therefore the first Gas Engineer of any public utility.

The first gas meter for which a patent was granted was that included in No. 3968 of 1815—granted to Samuel Clegg, Engineer, of the Gas Works, Peter Street, Westminster.

Samuel Clegg died on January 8, 1861, aged 79 and is buried at Highgate Cemetery. The death certificate describes him as a 'gas meter manufacturer (retired).' *The Journal of Gas Lighting* recorded that in his last years he repaid in full the creditors of the Liverpool engineering firm that failed and 'His late years were chiefly devoted to the perfection of a wet meter . . . and his last days were cheered by the approvals bestowed on it by many eminent gas engineers.'

This was his Patent 882 of 1858 for a meter with a rotating drum having (preferably four) eccentric chambers and being 'buoyed up by a central air vessel by which the pressure and friction on the axes are reduced.' The axes were located in fixed bearings.

The manufacturers and sole licensees of Clegg's new patent hydraulic gas meter showed at the International Exhibition of 1862 developments by their foreman, a young man named Henry Kromschroeder, who had come from Osnabrück, in the then Kingdom of Hanover, to learn the gas business in England, the cradle of the gas industries of the world.

Henry married at St. Pancras Church on March 21, 1858, was joined by his younger brother, John, and they both settled here and were active in the British gas industry for some 50 years.

In November 1862 the exhibit was transferred to the Museum of Patents and may now be seen in the Gas Gallery at the Science Museum, South Kensington.

It is to Patent 650 of 1862 in which a rotating drum with (preferably five) eccentric measuring chambers has its axes supported in a lever frame arranged to rise and fall in the same vertical plane (to compensate for variation in water level in the meter) and provided at one end of the lever frame with a floating bell type regulator and safety cut-off device and at the other end with a counterbalance.

In this patent, Henry Kromschroeder acknowledges (page 4, line 34) that the measuring drum used is similar to what is known as Clegg's drum, it having eccentric measuring chambers.'

This meter, invented and made in Great Britain, was used extensively not only here but also on the Continent. From it came the establishment nearly 100 years ago of the firm G. Kromschröder of Osnabrück, originators and pioneers of the one-pipe principle of gas installation described in your issue of the 16th November 1955, on whose board today sits a member of the Kromschröder family, and in whose published record Samuel Clegg is remembered.

Yours faithfully,

T. B. V. HIRST.

9 St. Andrew's Mansions,
Dorset Street,
London, W.1.

DEAR SIR,

I was most interested in Mr. Schofield's appreciation of the work of Samuel Clegg the elder in your issue of January 4, for Clegg not only introduced the gas meter, but also may be said to have fathered it.

His patent of 1815 includes a wet meter, and this was the first time that any such work had been recognised. This meter was greatly improved in 1819 by John Malam, who was Clegg's son-in-law, and, like him, an employee of the 'G.L.C.'

By the time the 1859 Gas Sales Act was passed, incorporationg as it did the present requirements for accuracy in a meter, Clegg's original ideas had been so improved upon that wet meters were able to meet the legal demands.

Workers who had made this possible included not only such men as Malam, Crosley, Sanders and Donovan, but also Clegg himself, who, in 1858, was granted the last of a series of patents referring to gas meters.

Even if Clegg's earlier attempts to construct a dry meter proved abortive, it was not until 1820 that a patent was granted for such a meter, and this was to John Malam.

Nevertheless, work on dry meters seems to have produced no practical results until about 1833, followed by the exploitation of American work by the Dry Meter Company in 1834.

All this may be taken to show the difficulty faced by technologists such as Clegg in attempting to develop a dry meter.

It is indeed as a technologist that Clegg appears a most impressive figure to-day.

His methods of approach to a problem involved the brilliant application of the then known scientific principles, and he can be said to be the first man to approach the work of the gas industry with the outlook of a chemical engineer.

Yours faithfully,

C. P. HENSHILWOOD.
Officer in Charge,
Meter Laboratory,

Watson House Centre,
S.W.6.

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